

CLAIMS

1. Optical device (D) for transforming the propagation mode of optical signals, comprising at least a first mode converter (3) associated with a multimode fibre (4), the first converter (3) being supplied with signals that are propagated in accordance with a first guided mode and delivering those signals in the multimode fibre (4) partly in the first guided mode and partly in a second guided mode of a higher order than the first, characterized in that the multimode fibre (4) comprises at least first passive filtering means (R, R1) which are arranged to convert the first guided mode into at least one dissipative cladding mode in order to prevent or limit the propagation of the signals in this first guided mode while at the same time authorising the propagation of the signals in the second guided mode in the multimode fibre (4).
2. Device according to claim 1, characterized in that the first filtering means (R, R1) are produced in the multimode fibre (4) in the form of a first long period grating, the period (P, P1) being selected as a function of the dissipative cladding mode.
3. Device according to either claim 1 or claim 2, characterized in that the multimode fibre (4) comprises at least second passive filtering means (R2) arranged to convert a third guided mode, of a higher order than the first, into at least one dissipative cladding mode in order to prevent or limit the propagation of the signals in this third guided mode while at the same time authorising the propagation of the signals in the second guided mode in the multimode fibre (4).
4. Device according to claim 3, characterized in that the second conversion means (R2) are produced in the multimode fibre (4) in the form of a second long period grating, the period (P2) being selected as a function of the dissipative cladding mode.

5. Device according to any one of claims 2 to 4, characterized in that the multimode fibre (4) comprises a cladding (7) having an outside radius whose value at the first (R, R1) and/or second (R2) filtering means is lower than the value on each side of those first and/or second filtering means.

6. Device according to any one of claims 2 to 5, characterized in that the first (R, R1) and/or second (R2) long period grating(s) exhibit(s) a variation in the period in order to ensure broadband filtering.

10 7. Device according to any one of claims 2 to 6, characterized in that the first (R1) and/or second (R2) long period grating(s) exhibit(s) an index modulation profile over a selected length in order to provide spectral filtering of substantially rectangular shape.

8. Device according to any one of claims 1 to 7, characterized in that it comprises, downstream of the first (R, R1) and/or second (R2) filtering means, a second mode converter (6) arranged to convert into the first mode the second mode of the signals that are propagated in the multimode fibre (4) which supplies it.

15 9. Device according to claim 8, characterized in that the first (R, R1) and/or second (R2) filtering means are placed in the vicinity of the second mode converter (6).

20 10. Device according to claim 9, characterized in that the first (R, R1) and/or second (R2) filtering means are placed upstream of the second mode converter (6) at a distance of a few tens of centimetres to a few centimetres.